

Midland Engineering Co., Inc. Safety Management System			Doc No:	LOCKTAG
			Initial Issue Date	12/14/15
			Revision Date:	Initial Version
25-Lockout-Tagout			Revision No.	0
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PURPOSE

This procedure establishes minimum requirements for locking out and tagging switches, valves, circuit breakers, and other energy controlling devices when their unexpected energizing, start-up, or release of stored energy could cause harm to an employee or damage equipment or machines. It shall be used to ensure that the machine or equipment is isolated from all potentially hazardous energy.

SCOPE

This procedure applies to all operations involving Midland Engineering Co., Inc.

REFERENCES

29 CFR 1926.417 - Lockout and Tagging of Circuits

29 CFR 1910.147 - The Control of Hazardous Energy - Lockout/Tagout

SUMMARY

Accidents involving electrical, mechanical, and/or pressurized equipment and systems have occurred in the construction industry due to incomplete planning of the work or task to be performed (failure to lock and tag out equipment and systems). Work performed on temporary electrical services and pressurized pipelines is equally as important from the standpoint of the use of the lockout/tagout procedure as is permanent plant equipment and systems.

Lockout/Tagout is maintenance oriented and the key to the process of lockout/tagout is the isolation of a machine's energy source so there is not a sudden, unexpected release of stored electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy that could injure maintenance personnel and employees. Lockout does not simply mean throwing the machine or equipment in the off position. Placement of a lockout device (lock) on an energy-isolating device (power box lever) prevents operation. Tagout is a form of communication warning employees not to energize the machine or equipment.

RESPONSIBILITY

Only authorized employees who have received instruction and training on lockout/tagout procedures can lockout a piece of equipment and they are referred to as lockout/tagout supervisors. All other employees receive affected personnel training.

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DEFINITIONS

Affected Employee means a person whose job requires him/her to operate or use a machine or piece of equipment that is locked or tagged out.

Authorized Employee means a person (lockout/tagout supervisor) who performs lockout/tagout procedures on a machine in order for servicing and maintenance activities to take place. Their name will be on the device place card.

Capable of Being Locked Out, means an energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it.

Device see Lockout Device or Tagout Device- any means to warn or lock out a piece of equipment

Energized, means connected to an energy source or containing residual or stored energy.

Energy Isolating Device means a mechanical device that physically prevents the transmission or release of energy.

Locks means only locks approved and issued by the company specifically for lockout/tagout procedures. A tag must accompany a lock each time it is used.

Lockout means the placement of a lockout device on an energy-isolating device, in accordance with the established lockout procedure, ensuring that the energy isolating device and equipment being controlled cannot be operated.

Lockout Device, a device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the off position and prevents the energizing of a machine or piece of equipment. The identity of the employee placing the lock must be on the device.

Tagout means the placement of a tagout device on an energy-isolating device, in accordance with the established procedure, to indicate that the energy isolating device and machine or equipment being controlled may not be operated.

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Tagout Device means a warning device, such as a tag and means of attachment, which can be securely fastened to an energy-isolating device, in accordance with the established procedure, to indicate that the energy isolating device and machine being controlled may not be operated. The identity of the employee placing the lock must be on the device.

Zero Energy State, the protection by isolation, blocking, and/or release of all sources of energy within equipment.

Danger Tag Electric- The tag is attached to a switch, circuit breaker, and other electrical controlling devices to warn others that the equipment and/or system has been isolated (from its power source (de-energized) and that employees are working on the equipment and/or system. The Danger Tag-Electrical placed on equipment and systems is not to be removed by anyone other than the person whose signature is on the tag and the equipment and system is not to be operated with the tags in place.

Danger Tag-Mechanical-The tag is attached to valve handles, all applicable circuit breakers, switches, and other operating mechanisms to prevent manipulation or operation of mechanical equipment and pressurized systems when work is being performed. It shall also be used to secure valves between operational and non-operational sections of a system. All Danger Tags-Mechanical shall be numbered in sequential order, and the letter M shall identify that the danger tag is to be used for MECHANICAL tagging only.

Caution Tag- may be used to inform personnel of special precautions or instructions relative to safe and proper operation of equipment. This tag is not to be used to prevent equipment and systems from being operated.

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FORMS OF HAZARDOUS ENERGY

There are many different types of machinery and equipment used by the company. Prior to shutting down machinery or equipment the authorized employee shall have knowledge of the type & magnitude of the energy, the hazards of the energy to be controlled, & the methods or means to control the energy. Energy comes in many forms and can exist in two states, active and stored. Machinery and equipment used by the company are identified on the master equipment list and discussed individually in the Energy Control Shutdown Forms section of this program. The following are different forms of hazardous energy:

- Electrical
- Compressed Air (Pneumatic)
- Petroleum Fuels (Fuel Lines)
- Gravity (Suspended Components)
- Hydraulic
- Tension
- Chemical
- Thermal (Surface Temperature)

AUTHORIZED EMPLOYEE

The only employees authorized to lock or tag machinery and equipment and remove their locks and tags are personnel who have had specific lockout/tagout training and are authorized by the company. Authorized employees have received information and training on energy sources and stored energy with machinery and equipment used by the company. Machinery and equipment will not be energized without the consent of an authorized employee. Unauthorized removal of locks or tags will be grounds for disciplinary action and/or grounds for termination.

An authorized employee must have the primary responsibility when working in a group setting for set number of individuals. The authorized employee should ascertain the exposure status of individual group members. Each employee shall attach a personal lockout or tagout device to the group's device while he/she is working & then removes it when finished. During shift change or personnel changes, follow the specific procedures to ensure the continuity of lockout or tagout procedures. Documentation on the ENERGY CONTROL SHUTDOWN FORM. shall be specific.

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AFFECTED EMPLOYEES

Affected employees are individuals who cannot use machines or equipment for production due to lockout/tagout devices. If the machine, which you frequently use, is to be locked-out for maintenance or repair you will be verbally notified. You will also be notified if you typically use the products of the affected machine (such as materials cut to specific lengths). This will allow you to make other arrangements for obtaining the materials you need to do your work and/or do projects that do not require the affected machine. Do not attempt to restart any machinery or equipment that is locked or tagged. When the machinery or equipment is ready for production the lockout/tagout supervisor will notify affected employees. Do not attempt to remove any energy-isolating device.

LOCKOUT/TAGOUT PROCEDURE

Since Midland Engineering Co., Inc. doesn't perform work on the same pieces of equipment or areas regularly, the ENERGY CONTROL SHUTDOWN FORM located in this section will be filled out prior to lockout/tagout procedures.

Preparation for Lockout/Tagout - Make sure to locate and identify all isolating devices to be certain which switches, valves, or other energy isolating devices apply to the equipment to be locked out and tagged. More than one energy source may be involved.

Shutdown - The machine or equipment shall be turned off or shutdown using the procedures established for the machine or equipment in the ENERGY CONTROL SHUTDOWN FORM. This is required in order to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

Lockout/Tagout Sequence - Each maintenance person working on equipment will have his own lock and the only key to that lock for locking out equipment. The master key to lockout locks is available only to maintenance supervisor and safety director. The following steps will be taken to safely secure a listed machine for servicing and/or repair.

- Notify all affected employees and supervisors that lockout/tagout is required.
- The machine to be serviced/repared will be shut off using the standard operator controls, i.e. off switch, trigger release.

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- Disconnect or isolate all energy sources. Some machines are of new construction and contain several safety interlocks. During work on gas, air, oil, acid, steam, and water lines the main valve will be closed and locked out. (Examples such as Release Tension, Release Compressed Air, Lower Hydraulics Bleed Gas Lines, Unplug Electrical Cords, Remove Spark Plugs, Bleed Hydraulics, Block Suspended Components, Block Rotating Parts, and Insert Blind Flange in Process Pipes)
- Inspect the machine for any sources of stored energy. If re-accumulation of energy is possible then continuous verification of isolated energy is required until work is completed. Make sure that nothing in or on the machine will cause any unexpected movement, which may cause any injury to those servicing the machine.
- Lockout/Tagout all energy sources with company locks and tags. When a switching device is encountered that cannot be locked out, a proper tag may be used.
- Each authorized employee involved in the work must lock and tag the main on/off switch. When three or more authorized employees are to work the same job, a lead employee has primary responsibility to perform the lockout/tagout and only the lead employee is then required to apply locks and tags. After the lead employee's shift is over, a new lead employee must take over locking responsibility to ensure continuity of the machine/equipment being isolated from power sources.
- Attempt to activate the machine by turning the operator switch to the on position. If the machine does not energize return the switch to the off position. If the machine does energize inspect it for the sources of energy and de-energize. Then repeat the attempt to reactivate the machine.
- Once the operator control has been returned to the off position, release the machine as "LOCKED-OUT" and maintenance/repair efforts may proceed.

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Lockout/Tagout Authorized Release Sequence - Utilize the following procedures for returning a machine to service.

- Inspect the machine to make sure that no tools, product or other parts have been left on the machine, which may cause a hazard when the machine is re-energized.
- Inspect to make sure that if any operating safety guards have been removed during the servicing/repair process, they are replaced before the machine is energized.
- Clear all employees from the area of the machine, particularly those areas close to or near any moving parts.
- Check to make sure the operator controls are in the off position.
- Remove the lockout security device and re-energize the machine.
- Activate the machine by moving the operator switch to the on position and observing the operation of the machine.
- Switch off the machine and ensure that it ceases operation.
- Notify the affected employee that the machine is available for use.

USE OF TAGS

The standard Danger Tag, Electrical Tag or Mechanical Tag shall be used only for the purpose of identifying a de-energized piece of equipment or system. It is not to be used as a substitute for a defective tag or a caution tag. A Caution Tag is to be used to inform personnel of special precautions or instructions relative to safe and proper operation of equipment. Do not use a Caution Tag to prevent a system or piece of equipment from operating. Only a Danger Tag can be used to prevent the operation of a system or piece of equipment.

The unauthorized removal of a Danger Tag from the controlling device of de-energized system or pieces of equipment shall be grounds for immediate disciplinary action of the involved employee(s). The unauthorized operation of a controlling device of a de-energized system or piece of equipment, which has been tagged-out with a Danger Tag, shall be grounds for immediate termination of the involved employee(s).

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EXCEPTIONS

The person installing locks normally removes the locks. Locks may also be removed due to any emergency or when an employee forgets to remove his or her lock at shift or job completion. In these rare occasions the supervisor will be responsible for completing the Emergency Removal of Lock Form and having the lock removed. The following steps are to be taken:

- **Attempt to contact the owner of the lock to be removed. He or she can tell you the status of the equipment.**
- **Whether the owner is reached or not, inspect the work site and equipment or machine to ascertain if the lock can be removed without endangering employees.**
- **If necessary contact a maintenance, electrical, or production employee to help inspect the equipment to be unlocked.**
- **If you cannot ensure the condition of the machine or equipment is safe, do not release it. Only a member of supervision can have a lock removed.**
- **Remove the lock by cutting or other means. This action takes personal responsibility for others' safety. Unauthorized cutting is a mandatory discipline offense.**

PERIODIC INSPECTION

The company safety director will verify that the Lockout/Tagout Program and Procedure is being followed by performing an annual inspection. The purpose of the inspection is to correct any deviations or inadequacies observed. A certified review of the inspection shall be documented and include the following identifying information: date, equipment, employees & the inspector.

ENFORCEMENT

Failure to follow the Lockout/Tagout program can create life threatening or serious injury situations and permitting employees and/or contractors to not follow procedure will result in disciplinary action up to and including discharge.

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Group Lockout/Tagout Requirements

- Protection must be utilized which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device [29 CFR 1910.147(f)(3)(i)].
- Primary responsibility for a set number of employees working under the protection of a group lockout or tagout device must be vested in a single authorized employee [29 CFR 1910.147(f)(3)(ii)(A)].
- The single authorized employee must determine the exposure status of individual group members [29 CFR 1910.147(f)(3)(ii)(B)].
- If there will be more than one crew, department, or group involved in the activity, a single authorized employee must be designated to coordinate affected workforces and to ensure continuity of protection [29 CFR 1910.147(f)(3)(ii)(C)].
- Each authorized employee must affix a personal lockout or tagout device as required in the standard when work begins and remove it when work is completed [29 CFR 1910.147(f)(3)(ii)(D)].

Group LOTO Procedures

Group LOTO procedures are an option when servicing and/or maintenance is performed by a crew, shop, or other group. Group procedures must afford employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. Group lockout/tagout:

- Reduces the number of locks and tags applied by authorized personnel.
- Reduces the amount of time required to apply and remove locks and tags.
- Complies with OSHA and all other applicable requirements for hazardous energy control. Provides safe working conditions for all authorized employees by developing methods to be used that will maintain both the integrity and security of the group lock and tag.

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Group LOTO Initial Requirements

To ensure the integrity of the group lockout/tagout method, the following must occur before group lockout/tagout is implemented:

- Identify trade leaders for each trade who will be responsible for applying group locks.
- Provide the trade leaders with the devices necessary to perform proper group lockout/tagout.
- Train personnel on the correct procedures to apply and remove locks and tags in a group lock and tag situation.
- Ensure the LOTO procedure is reviewed, verified and signed by each trade leader.

Implementation of Group LOTO

Group LOTO will be implemented in any of the following situations:

- Three or more authorized personnel from one department are involved in the servicing and maintenance of equipment.
- More than one shop, trade, department, or college is involved in the isolation of and/or servicing and maintenance of equipment.
- Three or more contractor personnel are involved in the construction, maintenance, or retrofitting of equipment.

Definitions Applicable to Group Lock and Tag

Authorized person- A person who performs servicing or maintenance work on machines or equipment while under the direction of a designated Trade Leader from his or her same trade/shop and protected by group locks and tagout devices applied by that Trade Leader.

Trade Leader- A designated authorized employee whose primary responsibility is to protect a specific number of same trade/shop employees working under a group lockout/tagout

Electrical Maintenance Coordinator- A qualified electrical worker whose primary responsibility is to make the initial isolations on electrical tubs, feeder breakers, and MCC switchgear in preparation for maintenance and servicing work on electrical equipment related to plant process, maintenance buildings, laboratories and instructional/ administrative buildings.

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Group LOTO Authorized Person Duties

Carry out work assignments in conjunction with Group LOTO procedures and informed instructions from Trade Leader and/or Electrical Maintenance Coordinator. If in doubt about any phase of the work assignment, ask questions before beginning assignment and ensure that the information provided is understood and accurate.

TRADE LEADER DUTIES

Application of Group Lockout/Tagout

- Notify affected Midland Engineering Co., Inc. and contract personnel in the immediate area where lockout/tagout is being performed for the servicing and maintenance of equipment.
- Coordinate isolations and the application of lockout and tagout devices with other authorized personnel from different crafts.
- Apply Midland Engineering Co., Inc.-approved group locks and tagout devices to isolation devices identified in the LOTO procedure.
- Verify that isolation devices used to control hazardous energy are working.
- Inform other authorized same trade employees working under a group lockout/tagout of both the isolation and verification steps taken to ensure that the hazardous energy associated with equipment to be serviced has been controlled.
- Secure the key for the group locks by placing it inside the group lock box and affixing his or her personal lock to the lock box.
- Ensure that all authorized same craft employees working under the group lockout tagout have affixed their personal lock to the group lock box.

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Removal of Group Lockout/Tagout

- Ensure that all tools and equipment are removed from the work area after the servicing or maintenance work has been completed.
- Notify the same Trade Leader if he or she must leave the work area prior to completion of the servicing or maintenance work.
- Upon completion of the servicing or maintenance work, notify his or her same Trade Leader that the equipment, machinery, or utility is ready to be returned to service.
- Maintain the integrity of the group lockout/tagout by removing his or her lock and tagout device from the group lock box, only after the Trade Leader(s) have removed their personal lock and tagout device from the group lock box.
- Assist the same Trade Leader in notifying affected personnel in the area that the equipment, machinery, or utility is being placed back into service.

ELECTRICAL MAINTENANCE COORDINATOR DUTIES

As required to ensure the safe work practices and worksite conditions of Midland Engineering Co., Inc. employees (Trade Leaders and Authorized Employees), and consistent with the Midland Engineering Co., Inc. Arc Flash training program.

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GROUP LOCKOUT/TAGOUT SHIFT CHANGE/OVERTIME

The Trade Leader who initially applied group locks and tags for his or her same craft authorized employees shall be responsible for ensuring the safe transfer of those locks and tags while maintaining the integrity of the group lockout/tagout.

All oncoming shift/overtime and off-going shift authorized employees from the same craft who have been or will be performing the maintenance or servicing work must be at the location where the work is taking place before the exchange of both personnel and tags can take place.

Before removing his or her group locks, the off-going shift Trade Leader shall:

1. Notify all affected and authorized employees in the immediate area that the exchange of group locks is in progress.
2. Inspect the work area to ensure that all tools and nonessential items have been removed from the work site.
3. Ensure that all authorized oncoming shift/overtime and off-going shift employees are on site and accounted for.
4. With the oncoming shift Trade Leader present, verify that all the isolation devices are in the proper positions to both control and/or relieve hazardous energy associated with the equipment being serviced.
5. Ensure the oncoming shift Trade Leader and staff review and verify the LOTO procedure. Only the Trade Leader is required to sign the LOTO procedure.

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REMOVAL OF GROUP LOCKS AND TAGS

1. In the presence of both the oncoming shift and off-going shift Trade Leaders, all off-going shift authorized employees shall remove their personal locks and tags from the group lockout box. When this has been completed, the off-going shift Trade Leader shall remove the key for the group locks from the group lock box.
2. To maintain the integrity of the group lockout/tagout, the overtime or oncoming shift Trade Leader shall apply his or her group locks and tagout devices to the isolation devices before the off-going shift Trade Leader can remove his or hers. The exception to this rule is the group lock box.
3. When the overtime or on-coming shift Trade Leader's group locks have been applied to the isolation devices and the verification steps have been completed, the off-going shifts Trade Leader's group locks and tagout devices may be removed.
4. The oncoming Trade Leader shall account for all his or her same craft authorized employees before the exchange of group lock can begin.
5. All same craft authorized off-going shift personnel shall be present at the group lock box before the removal of their personal lock from the group lock box can begin.
6. When the off-going shift authorized employees have removed their personal lock, the oncoming shift Trade Leader shall remove the key to his or her group locks from inside the group lock box.
7. Before the off-going shift Trade Leader can start removing his or her group locks and tagout devices, the overtime Trade Leader shall place the key for group locks inside the group lock box and then affix his or her personal lock to the outside of the group lock box.
8. All same craft authorized overtime personnel shall affix their personal locks to the outside of the group lock box. Once this step is completed, the off-going shift Trade Leader shall remove the group locks and tagout devices from the isolation devices.

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GROUP LOCKOUT/TAGOUT OF ELECTRICAL EQUIPMENT OVER 480 VOLTS.

1. The requesting party shall submit an Electrical Power Outage Request form to the FM Electrical Shop one week prior to the planned shutdown.
2. The Electric Shop Supervisor has the authority to approve or deny this
3. request.
4. The requesting party must receive an approval notice from the Electric Shop before de-energizing electrical power over 480 volts.
5. Only Electricians (qualified electrical workers, high voltage) who are certified in maintaining high voltage equipment are qualified to act as authorized personnel during the de-energizing and energizing of electrical power in excess of 480 volts.
6. The Electrical Maintenance Coordinator shall be the first to apply locks and tagout devices and the last to remove them.
7. Under no circumstances shall unqualified University personnel be allowed to open or close electrical breakers in excess of 480 volts.

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INFORMATION AND TRAINING

All employees will be informed as to the procedures of the Lockout/Tagout Program at the company upon assuming employment and will be updated during the term of their employment on any new equipment, new processes, or new job assignment. Information and training topics include the program, responsibilities, how to recognize lockout/tagout hazardous energy, isolation and control, and machinery and equipment lockout procedures.

Affected employees shall be informed of the specific purpose and use of the energy control procedure (lockout or tagout).

Authorized employees shall receive adequate training by mastering the following topics: recognition of hazardous energy sources, types and magnitudes of energy available, method and means necessary for energy isolation and control.

Retraining is required when there is a change in job assignments, in machines, a change in the energy control procedures, or a new hazard is introduced.

All training and/or retraining must be documented, signed & certified.

RECORDS MAINTENANCE

All completed forms will be kept on file. The following forms are included in this program:

- Machine and Equipment Shutdown Forms
- Periodic Inspection Form
- Quizzes & Acknowledgment of Training and Retraining
- Emergency Removal of Lock Form

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ENERGY CONTROL SHUTDOWN FORM

Department or Location of Equipment: _____

Equipment Name: _____ Date: _____

Authorized Employee: _____

Identify the types of energy in this machine and how a positive lockout/tagout procedure will occur:

Check When Complete:	Form of Energy:	Control Measures:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

·TEST ALL OPERATING CONTROLS TO ENSURE POSITIVE SHUTDOWN HAS OCCURRED.

·ENSURE ALL LOCKS AND TAGS ARE FASTENED AT THE POINT OF IGNITION.

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Annual Lockout/Tagout Inspection Form

Inspector: _____ Date: _____

1. Are lockout/tagout procedures being performed? Yes No

2. List Machines and Equipment inspected:

3. Is all lockout/tagout equipment accounted for? Yes No

4. List employees reviewed: _____

5. List all inadequacies identified: _____

6. Any new equipment being introduced? _____

7. Is old equipment being used in new ways or powered in new ways?

8. Are there any changes in voltage?

9. Is there an increase or change in line operating air pressure?

10. Corrective action taken: _____

Signature of Inspector: _____

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Lockout/Tagout Quiz

Name: _____ Date: _____

1. Energy exists in two forms, active and stored. True False
2. List three forms of hazardous energy: _____

3. List two situations where lockout/tagout is necessary: _____

4. A lock or tag may be removed by anyone. True False
5. Unauthorized cutting of locks will result in disciplinary action. True False
6. The purpose of lockout/tagout is to control hazardous energy True False
7. List two types of lockout devices: _____
8. An affected employee may lockout a piece of equipment. True False
9. A tag is a form of communication and warning. True False
10. A tag must always accompany a lock. True False
11. It is not necessary to notify all affected employees. True False
12. A tag must be placed at the point of ignition. True False
13. You should always test equipment to see if it will start after you have locked it out. True False

I acknowledge that I have received information and training on the Lockout/Tagout Program. This training has given me an understanding and the importance of controlling hazardous energy. I will abide by all rules, policies, and procedures set forth by the company. If I do not understand any instruction I will ask questions.

Employee Signature

Date

Instructor Signature

Date

Midland Engineering Co., Inc. Safety Management System			Doc No:	LOCKTAG
			Initial Issue Date:	12/14/15
			Revision Date:	Initial Version
25-Lockout-Tagout			Revision No.:	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 20 of 20

Emergency Removal of Lock Form

Name of Supervisor: _____ Date: _____

Name of person that owns the lock that must be removed: _____

1. Contact was made with the owner? Yes No Status of equipment:

2. The work site and equipment or machine to has been inspected to ascertain if the lock can be removed without endangering employees. Yes No Status:

3. Was it necessary to contact maintenance, electrical, or a production employee to help inspect the equipment to be unlocked? Yes No If yes, list employees:

IF YOU CANNOT ENSURE THE CONDITION OF THE MACHINE OR EQUIPMENT IS SAFE, DO NOT RELEASE IT. ONLY A MEMBER OF SUPERVISION CAN HAVE A LOCK REMOVED.

REMOVE THE LOCK BY CUTTING OR OTHER MEANS BY THIS ACTION YOU TAKE PERSONAL RESPONSIBILITY FOR OTHERS SAFETY. UNAUTHORIZED CUTTING IS A MANDATORY DISCIPLINE OFFENSE.

Signature of Supervisor